# Price Horizontal Direct-Drive Blower Coil Units

# Division 23 – Heating, Ventilating, and Air Conditioning

# Section 23 82 19 – Fan Coil Units

The following specification is for a defined application. Price would be pleased to assist in developing a specification for your specific need.

# PART 1 – GENERAL

##  Section Includes

1. Horizontal Blower Coil Units.

##  Related Requirements

1. Section 01 40 00 - Quality Requirements
2. Section 01 74 19 - Construction Waste Management and Disposal
3. Section 01 78 00 - Closeout Submittals
4. Section 01 79 00 - Demonstration and Training
5. Section 23 09 93 - Sequence of Operations for HVAC Controls.
6. Section 23 21 13 - Hydronic Piping: Connections to heating coils.
7. Section 23 21 14 - Hydronic Specialties: Connections to heating coils.
8. Section 23 31 00 - HVAC Ducts and Casings.
9. Section 23 33 00 - Air Duct Accessories.
10. Section 23 37 00 - Air Outlets and Inlets.
11. Section 23 82 00 - Convection Heating and Cooling Units: Air coils.
12. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

##  Reference Standards

1. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
2. AHRI 260 – Standard Sound Rating of Ducted Air Moving and Conditioning Equipment.
3. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils.
4. AHRI 430 – Standard Performance Rating of Central Station Air-handling Unit Supply Fans.
5. AMCA 210 - Standard Laboratory Methods of Testing Fans for Ratings.
6. ASHRAE 62.1 - Standard for Ventilation for Acceptable Indoor Air Quality.
7. ASHRAE 130 - Standard Methods of Testing for Rating Ducted Air Terminal Units.
8. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
10. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements.
11. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
12. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.

##  Administrative Requirements

1. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section, and require attendance by all affected installers.
2. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

##  Submittals

1. Product Data shall be provided with data indicating configuration, general assembly, and materials used in fabrication, including catalog performance ratings that indicate airflow, static pressure, NC designation, electrical characteristics, and connection requirements.
2. Shop Drawings shall indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
3. Manufacturer shall include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures from 1 to 4 inch water gauge.
4. Certificates shall be issued to certify that the air coil capacities, pressure drops, and selection procedures meet or exceed specified requirements or coils are tested and rated in accordance with AHRI 410.
5. Manufacturer's Installation Instructions shall indicate support and hanging details, installation instructions, recommendations, and service clearances required.
6. Project Record Documents shall record actual locations of units and controls components and locations of access doors.
7. Operation and Maintenance Data shall include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.
8. Manufacturer’s warranty shall be submitted and ensure forms have been completed in Owner's name and registered with manufacturer.
9. Maintenance Materials shall be furnished for the Owner's use in maintenance of the project.

##  Quality Assurance

1. Manufacturer Qualifications shall be specified in this section, with minimum ten years of documented experience.
2. Product Listing Organization Qualifications: The manufacturer shall be listed with an organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and be acceptable to authorities having jurisdiction.

##  Warranty

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 18 month manufacturer warranty from date of shipment for blower coil units.

# PART 2 – PRODUCTS

## 2.01 Horizontal Blower Coil Units

1. Basis of Design: Price Industries, Inc.
2. Horizontal Blower Coil Unit: BCHD.
3. Performance Requirements:
	1. Units shall have published sound power level data tested in accordance with AHRI 260.
	2. Coil performance shall be tested and certified in accordance with AHRI 410.
	3. Units shall be ETL listed in compliance with UL/ANSI 1995.
4. General:
	1. Furnish and install Price BCHD Blower Coil Units where indicated on the plans and in the specifications.
	2. Units shall be completely factory assembled, tested and shipped as one-piece except where noted.
	3. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery.
	4. All unit dimensions for each model and size shall be considered maximums.
	5. Units shall consist of a fan, motor, drive assembly, and coil in draw-through configuration, completely enclosed in the unit casing.
5. Construction:
	1. Unit Casing
		1. The unit casing shall be fabricated of 18 gauge galvanized steel panels.
		2. All exterior panels shall be insulated with one inch thick insulation rated for a maximum air velocity of 3600 feet per minute.
		3. The unit shall be provided with side and bottom access panels as standard, with screw type attachment. The size 08 unit shall be provided with a side access panel only.
		4. (**Optional**): The blower coil shall have a hinged tool free access panels on the side and bottom of the unit. Panels shall be capable of pivoting on either side and be completely removable.
	2. Inlet and Discharge Collar:
		1. All units shall have a minimum one inch duct collar on the inlet and discharge.
	3. Liners:
		1. Standard:
			1. Fiberglass Liner – FG
				1. Insulation shall conform to UL 181 for erosion and NFPA 90A for flame spread (25) and smoke developed (50) rating per ASTM E84 and UL 723.
				2. The insulation shall be secured with adhesive.
				3. Insulation edges exposed to the airstream shall be coated with NFPA approved sealant.
		2. **(Optional):**
			1. Closed Cell Polymeric Foam Insulation – FF
				1. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E84 or UL 723.
				2. The insulation shall be secured with adhesive.
		3. **(Optional):**
			1. Foil Board Insulation - FB
				1. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723.
				2. Insulation shall be secured with adhesive.
				3. Insulation edges exposed to the airstream shall be coated with NFPA approved sealant.
	4. Unit Mounting:
		1. Units shall be supplied with 9/16 inch diameter hanger rod holes in the top and bottom panels for through-bolt type suspension installation.
		2. (**Optional**) The unit shall be mounted with the use of :
			1. Spring isolators: The manufacturer shall supply spring isolators and hanger brackets, shipped loose for field installation with threaded hanger rods supplied by others. The spring isolators shall be rated according to the weight of the fan coil unit and oriented according to the manufacturer’s instructions.
	5. Blower:
		1. The blower shall be a direct-drive, forward curved, double width, double inlet fan, dynamically balanced fan.
	6. Motor:
6. The fan motor shaft shall be directly connected to the fan.
7. The fan shall be isolated from the casing to prevent transmission of vibration
8. The motor shall be an Electrically Commutated Motor (ECM):
9. Brushless DC controlled by an integrated controller/inverter that operates the wound stator and senses rotor position to electrically commutate the stator. The motor shall be supplied with a speed controller. The speed controller shall have dual outputs to control up to two motors, and allow for manual dial motor speed adjustment, or a [2-10 VDC] or [4-20 mA] signal for variable speed control.
10. Permanent magnet type motor with near-zero rotor losses designed for synchronous rotation.
11. Designed to maintain a minimum 70 percent efficiency over the entire operating range.
12. The ECM shall be furnished with factory programming (**select one**):
13. High Turndown Program
14. A high turndown program shall be provided to allow the ECM to operate with constant torque to vary the airflow with fluctuations in external static pressure.
15. The motor shall be capable of operating at low speeds to accommodate an increased turndown ratio, a wider airflow range, and decreased energy consumption as compared to typical pressure independent motor programs.
16. Pressure Independent Program
17. A pressure independent program shall be provided to allow the ECM to compensate for fluctuations in external static pressure, providing constant airflow.
18. The air volume flow rate shall be maintained to within five percent of desired flow in a system with up to 0.50 inches water gauge of external static pressure.
	1. Drain Pans:
		1. All units shall be supplied with a primary condensate drain pan in compliance with ASHRAE 62.
		2. The primary condensate pan shall be single wall galvanized steel for corrosion resistance, and shall extend under the entire cooling coil.
		3. Drain pans shall be of one-piece construction and be positively sloped for condensate removal.
		4. **(Optional)**: Provide primary with type 304 stainless steel construction for superior corrosion resistance.
		5. **(Optional)**: Provide a secondary drain connection on the primary drain pan for condensate overflow.
	2. Filters:
		1. All units shall be furnished with a two-inch filter section with access panels on both sides and the bottom of the frame. Filters shall be removable from either side or the bottom of the unit.
		2. The filter shall have a Minimum Efficiency Reporting Value (MERV) of [MERV8] or [MERV13]
	3. Electrical:
		1. Units shall be factory wired to an external electrical enclosure for a single point power connection.
	4. Unit Options:
19. Fresh Air Inlet:
20. The unit shall be supplied with a fresh air inlet consisting of a damper assembly and airflow sensor within a length of round duct
21. Damper Assembly:
22. The damper assembly shall be heavy-gauge, galvanized steel with a solid shaft rotating in bushings.
23. The damper shaft shall incorporate a visual position indicator etched into the end of the damper shaft to clearly indicate damper position over the full range of 90 degrees.
	* 1. The damper shaft shall be mounted on the [left], or [right] of the damper when looking in the direction of airflow.
24. The low leakage 18-gauge damper assembly shall incorporate a peripheral gasket on the damper blades for tight airflow shutoff.
25. Air leakage past the closed damper shall not exceed two percent of the unit maximum airflow at 3-inch water gauge inlet static pressure, tested in accordance with ASHRAE 130.
26. The damper, seal and bushing system shall be tested to 1.25 million cycles, or the equivalent of 100 full open/closures per day for 35 years, with no visible signs of wear, tear, or failure of the damper assembly after such testing.
27. Airflow Sensor:
28. The airflow sensor shall be a differential pressure airflow device measuring total and static pressure and shall be mounted to the inlet valve.
29. Plastic parts shall be fire-resistant, complying with UL 94.
30. The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Materials containing polybrominated compounds shall not be acceptable.
31. Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.
32. The airflow sensor shall be furnished with a minimum of twelve total pressure sensing ports and four static sensing ports and shall include a center averaging chamber that amplifies the sensed airflow signal.
33. The airflow sensor signal accuracy shall be plus or minus five percent throughout terminal operating range.
34. Inlet Valve:
35. The inlet valve shall be a consistent diameter to retain flex duct and provide a stop for hard duct.
36. The inlet valve shall include a 1/8 inch raised single bead weld for added strength.
37. The gasket seal shall be a low leakage continuous piece with a peripheral gasket for tight airflow shutoff.
38. The inlet valve shall include two heavy duty stop pins to accurately position the damper in the open and closed position.
39. Mixing Box:
	* + 1. The unit shall be supplied with a fully insulated mixing box section, shipped loose for field installation. The mixing box shall include factory assembled and installed control dampers, and slip and drive connections for quick field installation to the blower coil.
			2. The mixing box dampers shall be heavy gauge formed steel blade dampers in a heavy gauge steel frame. The damper linkage shall be factory furnished and installed.
			3. (**Optional**): The mixing box shall include low-leakage dampers with pressure sensitive, PVC blade edge seals, and flexible metal jamb seals.
			4. (**Optional**): The mixing box shall include interior formed steel side access panels.
			5. (**Optional**): The mixing box shall include a factory installed damper actuator mounted directly to the damper shaft for field wiring by others.
40. Water Cooling and Heating Coils:
	* + 1. All water coils shall be rated and certified in accordance with the current edition of AHRI 410 and shall bear the AHRI seal on the unit casing.
			2. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin, and shall be provided with a manual air vent fitting to allow for coil venting.
			3. Fins shall have a high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.
			4. All water coils shall be hydrostatically tested to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch at ambient temperature. All water coils are rated for a maximum of 300 pounds per square inch working pressure at 200 degrees Fahrenheit.

# PART 3 – EXECUTION

## 3.01 Examination

1. Verify that conditions are suitable for installation.
2. Verify that field measurements are as shown on the drawings.

## 3.02 Installation

1. Install the blower coils in accordance with the manufacturer's instructions.
2. See drawings for the size(s) and duct location(s) of the blower coils.
3. Provide ceiling access doors or locate units above easily removable ceiling components.
4. Support the terminal units individually from the structure.
5. Embed anchors in concrete in accordance with ASTM E488/E488M.
6. Do not support the terminal units from the ductwork.
7. Connect the fan coils to the ductwork in accordance with Section 23 31 00.
8. Install heating coils in accordance with Section 23 82 00.
9. Verify that electric power is available and of the correct characteristics.

## 3.03 Field Quality Control

1. See Section 01 40 00 - Quality Requirements, for additional quality requirements.

## 3.04 Cleaning

1. See Section 01 74 19 - Construction Waste Management and Disposal for additional cleaning requirements.

## 3.05 Closeout Activities

1. See Section 01 78 00 - Closeout Submittals for closeout submittals.
2. See Section 01 79 00 - Demonstration and Training for additional closeout requirements.